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OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH.

ISSUED QUARTERLY.

PUBLISHED BY
W. S. FRENCH, WEST NEWTON, MASS.

OFFICERS

OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH.

1891.

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MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

ORGANIZED 1890.

Vol. I. July, 1891. No. 3.

This Association, as a Body, is not responsible for statements or opinions of any of its members.

FIFTH REGULAR MEETING.

NEWTON, MASS., April 29, 1891.

THE fifth regular meeting of the Association was held at Newton by invitation of the local Board.

The members were met at the depot upon their arrival by the Newton Board of Health, and barges taken for a drive through this most beautiful suburb of Boston. The first point of interest was Waban Hill, where an inspection was made of the new reservoir in process of erection. This reservoir is to be completely covered, and is probably the first covered reservoir in the country, certainly in New England. The visitors were next taken through several of its handsome villages to Echo Bridge, so called, at Newton Upper Falls, where the Sudbury River conduit of the Boston Water-works crosses the Charles River.

From here it had been the intention to inspect the water-supply of the city, which is derived almost entirely from driven wells in a covered conduit or gallery chamber, but the time would not allow, so the direct route for West Newton was taken. Here the party was joined by some of the members arriving on later trains, and who had been taken to the new hospital buildings for the care of contagious diseases.

Upon arriving at West Newton a dainty lunch was served through the hospitality of the local Board, in Knights of Honor Hall, after which the business meeting was held in City Hall, close by, the President, Dr. Walcott, in the chair.

THE PRESIDENT — Before entering upon the regular business of the meeting, I understand that the local Board have a few words to say, and I would therefore call upon Mr. E. T. Wiswall of that Board.

MR. WISWALL — I have been requested by his Honor, Mayor Hibbard, who has been kept away by a very important business engagement, to extend to the Association his greetings in behalf of the city which he has the honor to represent, feeling that the deliberations of such a body can result only in benefit to the citizens of this community, as well as to those of the commonwealth at large. Mr. Pettee, Chairman of our Board, is unable to be with us, through the death of his wife, and he desires me in his own behalf, and also that of our Board, to extend to you all a cordial welcome to the "Garden City," and we trust that this meeting will prove to be one of the most valuable that we have had.

The records of the last meeting were read and approved.

THE PRESIDENT — The first business before the meeting will be action on the propositions for membership.

THE SECRETARY — I have the following list of applicants for membership who have been passed by the Executive Committee, and are recommended to the Association for election: —

HORACE M. LOCKE, M.D., Brockton, Mass.
P. R. MANUEL, M.D., Natick, Mass.
CHARLES B. FELCH, Natick, Mass.
WILLIAM G. MACDONALD, M.D., Boston, Mass.
H. LINCOLN CHASE, M.D., Brookline, Mass.
GARDNER T. SWARTS, M.D., Providence, R.I.
S. A. D. SHEPPARD, Newton, Mass.
ERNEST H. NOYES, M.D., Newburyport, Mass.
JOHN F. YOUNG, M.D., Newburyport, Mass.
HERBERT A. CLARKE, Newburyport, Mass.

By vote of the Association all the foregoing parties were unanimously elected to membership.

THE PRESIDENT — We will now listen to any committees that may wish to report.

Dr. Durgin, of the Committee on Legislation, reported what had been done by that Committee during the present session of the

Legislature, and the progress that was being made in the proposed changes of the statutes relating to the sale of "immature veal," etc.

Dr. John H. McCollom, city physician of Boston, then read a paper on the "Suppression of Infectious Diseases," followed by remarks from Dr. Chapin of Springfield, Dr. Comey of Clinton, Dr. Cutler of Waltham, Dr. Morrow of Gloucester, and Dr. Abbott of the State Board of Health.

A vote of thanks was then passed to the Newton Board of Health for the courtesies received from them.

The meeting then adjourned to the Woodland Park Hotel for the usual dinner, which was not as largely attended as usual, as many of the members felt obliged to leave early for their homes.

OBSERVATIONS ON THE SUPPRESSION OF INFECTIOUS DISEASES.

BY J. H. MCCOLLOM, M.D., OF BOSTON.

In this paper an attempt will be made to show what has been done in Boston during the past ten years in the suppression of the three principal infectious diseases, small-pox, scarlet fever, and diphtheria, and also to offer a few suggestions regarding the best methods to be employed for this purpose.

At first your attention will be asked to the subject of small-pox, a disease much more dreaded in the community than any of the other infectious diseases, and without reason, for in no other disease do we have the protective power of vaccination.

When we read the accounts of the fearful havoc that this disease caused before the discovery of vaccination, it is difficult to understand how any sane person can be in doubt for a moment regarding the advantage to be gained by this operation. It is painful to witness a severe case of scarlet fever; an attack of diphtheria is distressing alike to the patient and his friends; but an attack of unmodified small-pox in the amount of actual suffering, in the repulsiveness, in the intolerable odor, and in the subsequent disfigurement, far exceeds any of the other infectious diseases. One argument used by the anti-vaccinationists is that small-pox is not so prevalent now as it was formerly, and therefore the necessity of vaccination is not so great. This is the very best argument in favor of vaccination, and it proves, without a shadow of a doubt, the beneficial effects of the operation. Again, the statement is frequently made that vaccination does not protect; this remark is so erroneous, and so entirely without foundation, that it seems hardly necessary to attempt to refute it. No man of any experience in the treatment of small-pox has any doubt of the protecting and modifying power of vaccination.

I speak thus warmly in regard to this subject because I know the

immense amount of harm the anti-vaccinationists are doing, not only in England but also in this country. It therefore becomes us as officers of sanitary commissions, with the public health in our charge, to take a firm and steadfast position in regard to this matter. An argument frequently used by the anti-vaccinationists is, that the vaccine disease is not small-pox modified by its passage through the bovine species, but that it is a separate and distinct disease, and therefore it cannot be protective. The whole theory of the protective power of vaccination, which has been proved by innumerable experiments, is based upon the very fact that it is one and the same disease. An account of the latest experiments bearing on this subject is published in *La Semaine Médicale* of Dec. 31, 1890. The investigators, Professor Elternod, of the University of Geneva, and Charles Haccius, the Director of the Vaccine Institute at Lancy, are men eminently well fitted to pursue these investigations. Their conclusions are:

"1. Small-pox is inoculable on the bovine species when the method of operation is good and when the virus is taken at the proper time.

"2. Inoculation of the calf with small-pox forms a valuable source, in a new direction, of animal vaccine. This is of great practical value, not only for the vaccine institutions of Europe, but also for those of warm climates, where variola is frequently endemic, and where vaccine rapidly deteriorates.

"3. Variola inoculated on the calf is transformed after several transmissions into vaccine by its passage through this animal. This is not duality.

"4. Our practical conclusions confirm the ideas set forth by Depaul in 1863, at the Academy of Medicine of Paris."

Dr. Fischer, Director of the Vaccine Institute at Karlsruhe in Germany, performed at about the same time a series of similar experiments and he arrived at practically the same conclusions. This refutes the argument of the duality of these diseases.

The history of the great epidemic of 1872–73, in Boston, and the comparative freedom of the city from this disease since that time are most convincing arguments in favor of vaccination.

The operation of compulsory vaccination was suspended in Zürick, Switzerland, in obedience to popular clamor in 1883. The deaths from small-pox, per 1,000 deaths from all causes for the two previous

years and that year had been in 1881, 7; 1882, 0; in 1883, 8. They rose, after compulsion had ceased to be used, to 11.45 in 1884; to 52 in 1885, and in the first eight months of 1886, to 85 per 1,000.

Without wearying you with an immense amount of statistics, it may be of interest to state that for the past ten years the percentage of deaths from small-pox in the unvaccinated at the hospital in Boston has been 75, while of the vaccinated it has been only three. This, however, does not give a perfectly clear idea of the situation, for many of those who had been vaccinated did not have typical scars, and also in many instances the operation had been done a very long time previous to the attack of variola. There is no fatal case on record at the hospital in which vaccination was done within five years of the attack of the disease, except in those instances in which the patient was vaccinated at the time of exposure, and even then, if the operation was done within five days of the exposure the disease was always modified, to a remarkable degree.

The effect of one vaccination does not always last for a lifetime, and therefore the importance of re-vaccination is perfectly evident. For the ordinary exposure, in the routine of daily life, two or three vaccinations, at intervals of ten years, are sufficient; but after any extraordinary exposure a person should always be vaccinated.

In regard to the kind of virus to be used, I would say that my predilections are decidedly for animal lymph; because the protection is greater; because you can always be sure of an adequate supply for any emergency; because there is no danger of communicating syphilis. The possibility of communicating any other disease than this is so slight that no mention need be made of it. That certain eruptions do follow vaccination, and, owing to some inherent vice in the individual constitution are, in a measure, dependent on the operation no one with any experience will pretend to doubt; but these eruptions are acute in their nature and yield readily to treatment. A very common example of this condition is an eruption of urticaria following the ingestion of lobsters, or of strawberries, yet no one for a moment thinks of considering lobsters and strawberries unwholesome food. It is an interesting fact that young adults, and more particularly young immigrants, are liable to have these eruptions. In order to illustrate how frequently vaccination is unjustly blamed for the appearance of an eruption, I wish to relate the following case which occurred in my practice some few years ago. A

perfectly healthy child, five months old, was vaccinated with fresh calf lymph; at the end of eight days the vesicle was perfectly typical in appearance, and there was the usual amount of constitutional disturbance. At this time the mother of the child, who had never been vaccinated, expressed a wish to be vaccinated with lymph from the child's arm. This was done. At the end of four or five days the mother had a most extensive and general eruption of vaccinal urticaria, with marked constitutional disturbance. If, in this case, the mother had not seen the lymph taken directly from her child's arm, no amount of argument would have convinced her or her friends that the lymph was not impure. These vaccinal eruptions, which are comparatively frequent, and which can be easily explained, serve as a never-failing source of argument against vaccination.

Let us now pass to the consideration of the measures to be adopted for the suppression of small-pox. In Boston, as soon as a case is reported, the patient is visited and the diagnosis verified. If the disease proves to be small-pox the patient, in suitable cases, is removed to the hospital, with as many of the family as the circumstances seem to demand. The hospital is always ready to receive any number of patients. When the premises are vacated disinfection is immediately commenced. All persons in the vicinity, who have been exposed to the disease are vaccinated. There is a careful medical supervision of the infected locality until all danger of an outbreak of the disease has passed. Every inducement is offered for vaccination, which is free. The question of diagnosis is a very important one, and while it may be simple in a severe case, in a mild and modified form of the disease it is very often most difficult and perplexing. To give some idea of the difficulty of arriving at a positive diagnosis in these cases it is enough to say that during the past eight years there have been reported to the Board of Health as variola, about five hundred cases of eruptive disease, of which only forty-four were found to be small-pox.

In former years this disease was much more prevalent in Boston than it has been of late; but this comparative immunity cannot be explained by the wave theory of epidemics, and must, therefore, be due to the management of the outbreaks of small-pox that have occurred. Chart A represents the number of deaths from this disease in Boston for two decades; 1862 to 1871, and 1881 to 1890, inclusive. The years of the great epidemic, 1872 and 1873, have

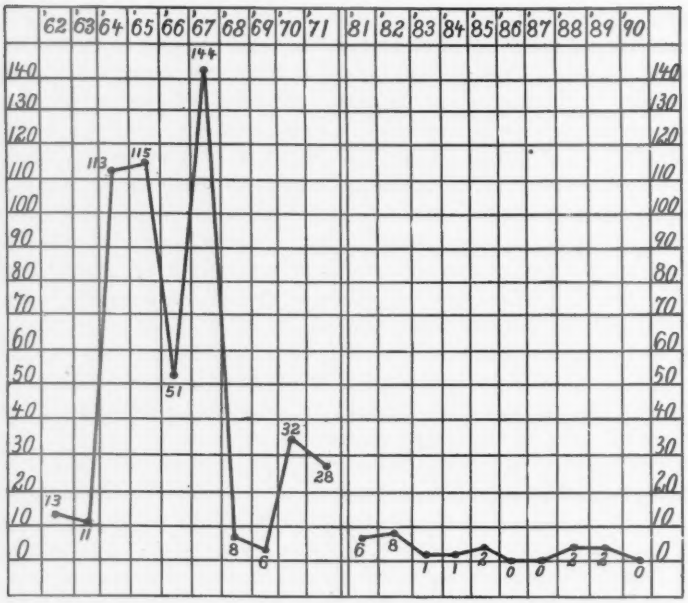


CHART A.

Deaths from Variola for Twenty Years—1862-71 and 1881-90.

Deaths 521, p. 211,865. Deaths 22, p. 425.250.

been purposely omitted; because, as this was an exceptional time, correct deductions could not be made from them. It can be seen at a glance that from 1862 to 1871, with a population of 211,865, Boston had 521 deaths from this disease, while from 1881 to 1890, inclusive, with a population of 425,250 there were only 22 deaths. It is of interest to note that during the last decade immigration was very much larger than during the first. It must also be borne in mind that during the last ten years Baltimore, Philadelphia and Montreal have had moderately severe epidemics of this disease.

SCARLATINA.

Satisfactory as the result has been in the suppression of small-pox there is no such favorable showing in the case of scarlet fever, although much has been done, and with improved methods still more

may be done. As this disease is pre-eminently one of childhood it is evident that the removal to a hospital cannot be so easily accomplished as in the case of small-pox, which attacks the unvaccinated of all ages alike, and rarely, if ever, attacks a vaccinated child. The existence of mild cases of the disease in the community; cases that are not recognized, and therefore are not reported, and in which there is no attempt at isolation, is one of the most potent factors in causing the prevalence of this disease. Notwithstanding the great amount of good done by the isolation of reported cases, to expect that this disease can be stamped out when in the schools and in the public conveyances, there are so many mild cases which serve as centres of ever widely extending waves of infection, is to expect an impossibility. The difference of opinion among physicians regarding the time when a case ceases to be infectious, is also a source of great danger to the public. Children are frequently permitted, on the certificate of a physician, to return to school, while they are passing through the stage of desquamation, and are therefore particularly liable to communicate the disease.

In Boston, a child living in a house where there has been a case of infectious disease, before he can return to school must bring a certificate from a physician stating that two weeks have elapsed since the death, removal or recovery of the last case reported. This regulation is a wise one so far as it goes; but, while the period of two weeks is long enough in the case of death or removal, the time of recovery is so vague and indefinite that it would be much better to require the lapse of six weeks from the commencement of the last case.

The isolation of a patient at his house is a difficult thing, but by the liberal use of disinfectants, and with the most careful and painstaking attention to detail, it can be accomplished, if the house is large enough and is occupied by only one family. In the ordinary tenement-house it is impossible.

The *British Medical Journal* of June 11, 1887, contains a paper entitled "Observations on a Method of Prophylaxis and an Investigation into the Nature of the Contagium of Scarlet Fever," by Drs. W. Allen Jamieson and Alexander Edington, in which are found some very important and interesting facts. Without quoting at length, it will be sufficient to give a few extracts:

"The method recommended was to disinfect the throat by painting it frequently with a strong solution of boracic acid in glycerine. In

dealing with the skin more exact methods were available. These consisted in the employment of warm baths every night from the very first, and in the application to the entire surface of the body, including the head, of an ointment composed of thirty grains of carbolic acid, ten grains of thymol, one drachm of vaseline, and one ounce of simple ointment. . . . Seven cases were selected; the baths and anointing were persevered in from the second day of the disease till the eighth day of desquamation, the seventeenth or eighteenth day of the disease. An ointment for inunction containing carbolic acid in the proportion of one in sixteen, had formerly been employed. Now and again slight evidences of absorption of carbolic acid had taken place, and therefore in these seven cases an ointment of only one in thirty-two was made use of. On the eighth day of desquamation one leg was once more carefully anointed, enveloped in a thick layer of sterilized cotton-wool, bandaged and covered with a stocking, and allowed to remain undisturbed till the thirtieth day. The wool was then removed by Dr. Edington, with the same precautions as in the other cases, and the scales transferred to sterilized tubes for cultivation. It will be seen that the wool was put on at a period of the disease before the bacillus had been obtained from the scales, in cases where no disinfectants had been applied to the skin. This method subjected the procedure, therefore, to a rather severe test. In cultivations of scales from five of the seven cases no bacillus was found. In two it appeared in the cultivating medium; but, whereas under ordinary circumstances the bacillary pellicle is formed in thirty-six hours it took six days to develop any evidence of its presence in the jelly. In five, therefore, the powers of reproduction of the bacillus had been checked by the method adopted, while in the two others a remarkable retardation of the virus had resulted. We submit, therefore, that proof, clinical and experimental, has been furnished that by such simple methods one can neutralize the contagiousness of scarlet fever, so far as that arises from the desquamating flakes of cuticle."

The importance of the facts brought out by these experiments is so great that the account of them has been quoted somewhat at length.

DIPHTHERIA.

The difficulties of dealing with an epidemic of scarlet fever, great as they may be, are much increased in the case of diphtheria. In the

first place one attack of scarlet fever, in the majority of cases, protects the person from subsequent attacks; in diphtheria just the reverse is true; the first attack predisposes to a second. In the second place, perplexing as the diagnosis may be in a mild case of scarlet fever, it is still more embarrassing in a mild case of diphtheria. In the third place, the erroneous opinion that true croup and diphtheria are separate and distinct diseases, and that important as isolation may be in the latter, it is unnecessary in the former, renders the stamping out of this disease an impossibility.

The investigations of Klebs and Loeffler, and the confirmatory experiments of Roux and Yersin show conclusively that the diphtheritic germ is not absorbed by the healthy mucous membrane, and that the frequence of this disease during an attack of tonsilitis or during the course of scarlet fever and measles is due to this fact. In these experiments it was found that simply painting the mucous membrane of animals with the culture fluid was not sufficient to cause the disease, but if the mucous membrane was wounded by a platinum wire charged with the culture, diphtheria was invariably produced. This fact also explains to a certain extent the prevalence of this disease in New England, for it is apparent to the most casual observer that disease of the respiratory passages are more common here than elsewhere.

The degree of infectiousness of diphtheria has an important bearing on the subject of isolation. A very considerable amount of exposure is necessary to contract diphtheria, and therefore a degree of isolation that would be useless in scarlet fever would be effectual in diphtheria.

One very important measure for the suppression of these diseases is the disinfection of school-books, but advisable as this is there seems to be at present no safe and reliable method for accomplishing it. Sulphurous acid gas will not do this; heat, although it may kill the germs of disease, also destroys the books, and the same may be said of chlorine, and of a solution of corrosive sublimate. A series of very interesting experiments bearing on this point was made some little time ago by two German observers, who found that, if the tips of the fingers were dry when turning leaves of books there was no deposit of microbes on them, but if the tips were wet with water or with the saliva a large deposit was found.

Another and still more important expedient for the suppression of

these diseases is a careful medical supervision of the schools, not only for the purpose of ensuring good ventilation, but more particularly for the detection of mild cases.

There can be no doubt that many epidemics are caused by the presence of these mild cases in the schools. Chart B shows the total number of cases of diphtheria and scarlet fever, by months, for five years in Boston, comprising an aggregate of 11,794 cases, certainly a number from which reliable deductions can be made. It will be

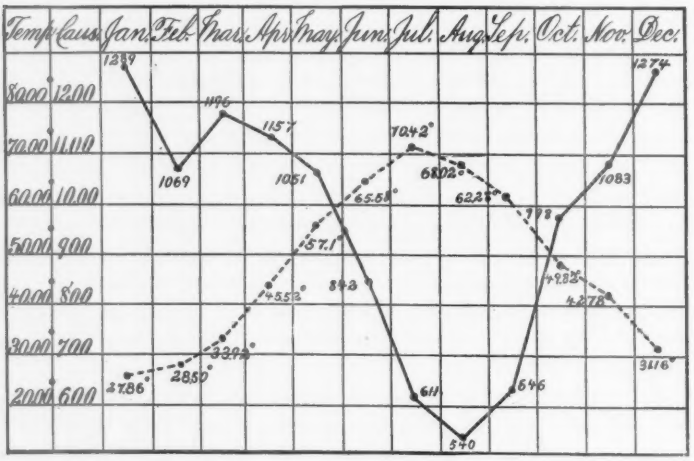


CHART B.

Cases of Diphtheria and Scarlatina, by Months for Five Years, with the Average Mean Temperature—1886-90.

Temp..... Cases——

seen at a glance that the largest number of cases occurred during the months of January, February, March, April, May, June, September, October, November and December, or during the time the schools were in session, while during July and August, or in vacation time, the cases diminished more than one-half. It is true that during the month of June there is quite a marked diminution; but this can be explained by the fact that at this time there is better ventilation in the school-rooms. It is very significant that during August, with an average mean temperature of 68.02°, when the schools are closed, the number of cases is 540, while in June, with an average mean

temperature of 65.58°, there are 842, and also that in May, with an average mean temperature of 57.10°, the number of cases reaches 1,087, more than twice as many as are reported in August. As the difference in the mean temperature between June and August is only 2.44°, being 65.58° in the former and 68.02° in the latter, it is not to be supposed that this slight difference can account for an increase of 300 cases, or in round numbers a fall of one degree in the temperature is responsible for an increase of 100 in the number of cases. If a low temperature has such a remarkable influence on the prevalence of these diseases as has been claimed by some, we ought, on general principles, to have instead of 1,289 cases in January, 4,000. Again, as is well known, the schools open in Boston on the first Wednesday of September, and during this month the increase is 100 as compared with the number of cases in August; but there is a still greater increase from September to October, November and December. By following the broken line which indicates the average mean temperature, it is evident that the temperature has no direct influence on the number of cases. This certainly refutes the argument that the low temperature of the winter months is responsible for the increase in the number of cases.

The method adopted in Boston for the suppression of these diseases is: First, a report of the case by the physician in attendance; second, posting of a card on the house notifying the public of the existence of the disease; and in the case of diphtheria examination of the drainage; third, investigation of the case by one of the medical officers for the purpose of giving advice regarding isolation, and the importance of removal to hospital when the case occurs in a tenement-house; fourth, the sending a notice of the case to the school committee and also to the public library; fifth, the sending of a printed circular to the house of the patient, containing plain and explicit directions regarding isolation and the best methods of disinfection of the clothing and discharges of the patient; sixth, the visitation of the house by the disinfector, who leaves a postal card addressed to the Board of Health, on which is to be stated when, in the opinion of the attending physician, the premises will be ready for disinfection. In the case of a death, as soon as the death certificate is received at the office of the Board of Health arrangements are immediately made for disinfection. It is, of course, understood that public funerals in these cases are prohibited.

The method of disinfection adopted at present consists in the use of a solution of corrosive sublimate one part to five hundred for washing the wood-work of the apartment, and walls, if painted; in some instances of sponging the mattresses and carpets with a similar solution. The apartment in which the patient has been ill is then tightly closed and four pounds of sulphur to every 1,000 cubic feet of space is burned in it. In addition to this there is an apparatus

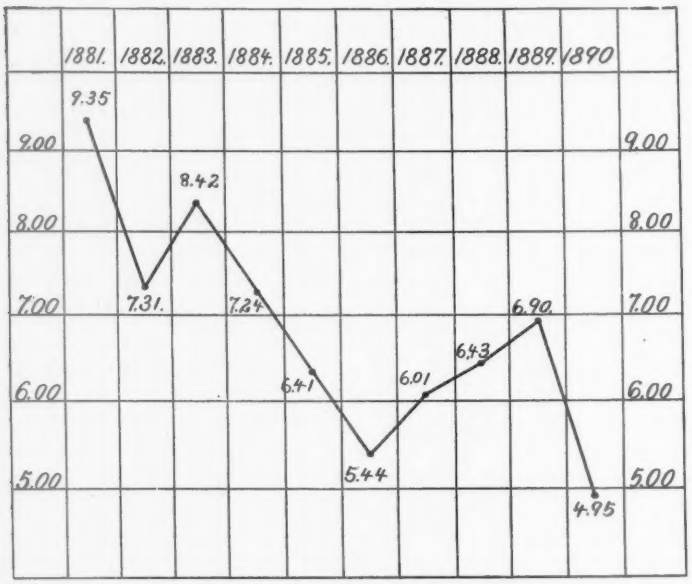


CHART C.

Percentage of Deaths from Croup, Diphtheria, Scarlatina and Variola to the Total Mortality for Ten Years—1881-90.

for the generation of a certain amount of steam, for it has been proved by many experiments that the disinfecting power of sulphurous acid is much increased by the presence of watery vapor. Without, at the present time, stating the arguments for and against the use of this substance as a disinfecting agent, it is sufficient to say that during the past five years only two per cent, or 236 of the cases of scarlet fever and diphtheria of the 11,794 reported, could by any

possibility be traced to infection from rooms or clothing that had been disinfected in the manner just described. So far as small-pox is concerned, in the 112 cases during the past ten years, where sulphurous acid gas has been the only disinfectant used, there is not a single instance of infection from an apartment in which there had been a previous case.

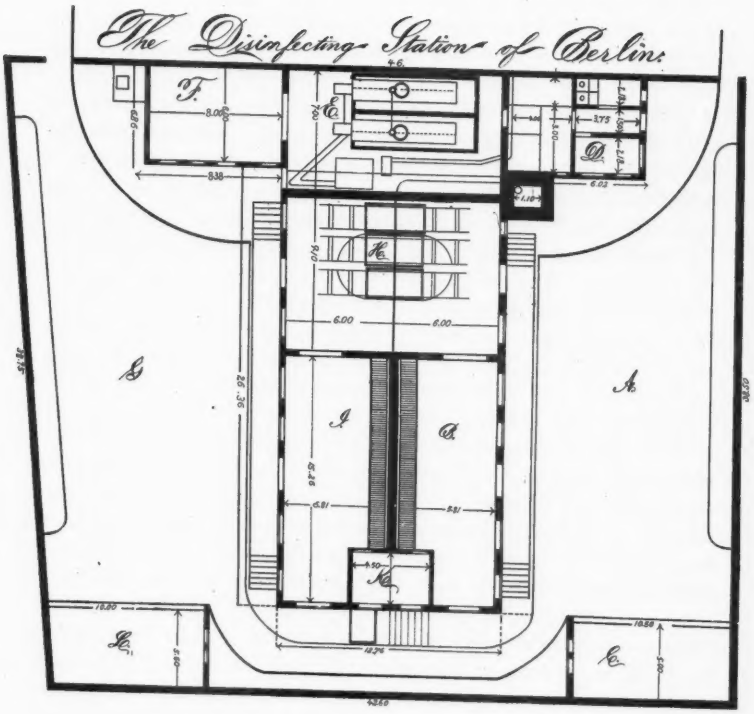
A study of Chart C, which indicates the percentage of deaths from croup, diphtheria, scarlet fever, and small-pox to the total mortality in Boston for ten years shows that in 1881 the percentage was 9.35; in 1882 it fell to 7.31; in 1883 it rose to 8.42; from 1884 to 1886 there was a gradual decline until the rate was 5.44; from 1886 to 1889, a somewhat exceptional period, in which these three diseases were quite prevalent throughout the whole country, the percentage gradually increased until it reached in 1889, 6.90; during the year 1890 it fell to 4.95; a diminution of nearly two per cent in a year, and of nearly five per cent in ten years. But it might be said by some that although the number of deaths from these diseases may have diminished, the number of deaths from other zymotic diseases has increased. The answer to this is the fact that in 1881 the percentage of deaths from all zymotic diseases was 26.67, and that the rate has gradually fallen to 16.47 in 1890, a diminution of nearly ten per cent. This certainly is a remarkable record, which cannot be explained by any of the so-called wave theories of disease, and it proves, if it proves anything, the beneficial effect of sanitary regulations.

DISINFECTION.

The whole subject of disinfection has such an important bearing on the suppression of infectious diseases that a few words regarding it may not be out of place at the present time. It is generally conceded that steam under pressure is the best disinfectant known. The arguments for and against sulphur dioxide are so many and so convincing that one is left somewhat in doubt regarding this agent. Dr. L. H. Thoinot, an eminent hygienist of France, published a very interesting and instructive paper in the *Annales d' Hygiène Publique* of October, 1890, on "Disinfection by Sulphur." After giving in detail the various arguments for and against the use of this substance he gave an account of a series of very carefully conducted experiments with the germs of septicæmia, malignant pustule, erysipelas, glanders, tubercle, typhoid fever, Asiatic cholera and diphtheria.

He found that the germs of septicæmia, malignant pustule and erysipelas resisted absolutely the action of sulphurous acid, although it was used in large doses and with a prolonged exposure; while the microbes of glanders, tubercle, typhoid fever and diphtheria were absolutely destroyed. This observer in speaking of the use of sulphur as a disinfectant in variola, says: "Former experiments, also, which have recently been criticised, teach us that sulphur is a good disinfectant for vaccine, and by analogy the conclusion has been reached that it is also an efficient disinfectant in variola. Its empirical use in epidemics of this disease has given satisfactory results." This writer recommends the use of sixty to seventy grammes of sulphur to the cubic metre of space, a quantity somewhat larger than is generally used in this country, and twenty-four hours' exposure. Finally this investigator gives as his opinion, based upon actual experiments, that disinfection by sulphurous acid should not be laid aside until we have a more perfect apparatus at our disposal, such as the stove for the generation of steam under pressure. In the meantime its scientific value should not be called in question in certain cases; nor the signal service it can render in the time of an epidemic, such as an epidemic of cholera, where it can be easily and promptly instituted at slight expense as a most efficient prophylactic agent.

Disinfection by a current of steam without pressure, which, until the year 1887, was used to such an extent on the Continent, is being gradually abandoned because of its unreliability and lack of penetrating power, and steam under pressure is being substituted. There are many different forms of the disinfecting stove, but the principle is the same in each. This consists in having an iron receiver capable of standing a pressure of thirty pounds to the square inch, and in which the temperature can be raised to 250° F., an iron truck on which to place the articles to be disinfected, a pipe for the admission of steam and one for the escape, a pressure gauge, and a thermometer. In the system of Rohrbeck there is a stage preliminary to that of disinfection which is said to increase the penetration, make the pressure uniform, and causes even saturation. This is done by partially exhausting the air in the stove before admitting the steam. The time required for disinfection by steam under pressure is fifteen minutes for articles not specially contaminated. In the case of special infection, an exposure of from thirty minutes to an hour is required.


The Disinfecting-Station of Berlin.
F.
E.
D.
H.
G.
A.
J.
K.
L.
L.
C.
4.6
8.00
8.38
3.75
6.02
6.00
6.00
22.76
5.81
5.81
1.50
18.74
18.29
18.58
43.50

The importance of a permanent disinfecting station in a large city cannot be overestimated. In Germany, and also in France and in England, hygienic measures, of which this is a very important factor, receive a much more liberal support from the Government than it is possible to obtain in this country. The disinfecting stations of Berlin, of Vienna and of Paris, are apt illustrations of this fact.

Plan D* represents the public disinfecting station of Berlin, opened in the year 1886. This station occupies a lot of land about 126 feet deep, 149 feet wide at one end, and 137 at the other; a central building divides this plot into two nearly equal courts, one for the reception of articles to be disinfected, the other for the delivery of articles after disinfection; a narrow passage connects these two courts. In each court is a wagon-house about 16 feet by 32, for the reception of the disinfecting wagons. At one end of the central building is the boiler-house, with two boilers; on one side of this is the coal-shed; on the other, bath-rooms, water-closets, and a place for the storage of chemicals. Immediately adjoining the boiler-house is the disinfecting apparatus, which consists of two rooms divided by a perfectly tight wall, and in which are the disinfecting stoves. Connected with the disinfecting chambers are two storage-rooms, each about 50 feet by 19, one for infected articles, the other for the disinfected. On the dividing wall are racks for articles disinfected or to be disinfected. At the end and between these two storage-rooms is the administration chamber, which can be entered only from the courts, and in which are two tightly closed windows having an outlook on the storage-rooms. The disinfecting stoves, made by Schimmel & Co., are three double-walled, iron chests, each about eight feet high, five feet wide and nine feet long. Each stove has a manometer to indicate the degree of pressure. A, represents the court for infected articles; B, the storage-room; C, the wagon-shed; D, the water-closets and bath-rooms; E, the boiler-house; F, the coal-shed; G, the court for disinfected articles; H, the disinfecting stoves; I, the storage-room for disinfected articles; K, the administration-room; L, the wagon-shed. The different parts of the station are connected by telephone. The utmost care is taken to prevent the contamination of disinfected articles either by the wagons or by the clothing of the disinfectors.

* Die Öffentliche Gesundheits, und Krankenpflege der Stadt, Berlin. Berlin, 1890, p. 98, et seq.

While the reliability of disinfection by steam cannot be disputed, it must be acknowledged that in certain conditions this process cannot be used, as, for example, in the disinfection of the walls of houses. For this purpose some gaseous disinfectant, therefore, is imperatively demanded. A painted wall can be disinfected by washing with a solution of corrosive sublimate, it is true, but for the cracked walls, covered with soiled paper, of the ordinary tenement-house, and for upholstered furniture, sulphurous acid seems to be the best agent to use, notwithstanding the fact that its disinfecting power has been disputed. Carefully conducted experiments prove, it is true, that when cultures of many microbes are placed on cloth and subjected to the fumes of sulphurous acid they are not sterilized; but the conditions are entirely different in the case of the microbes on the walls and floating in the air, for in the latter the germs are exposed directly to the action of the gas and are therefore more easily killed, while in the former the fibre of the cloth protects them to a certain extent.

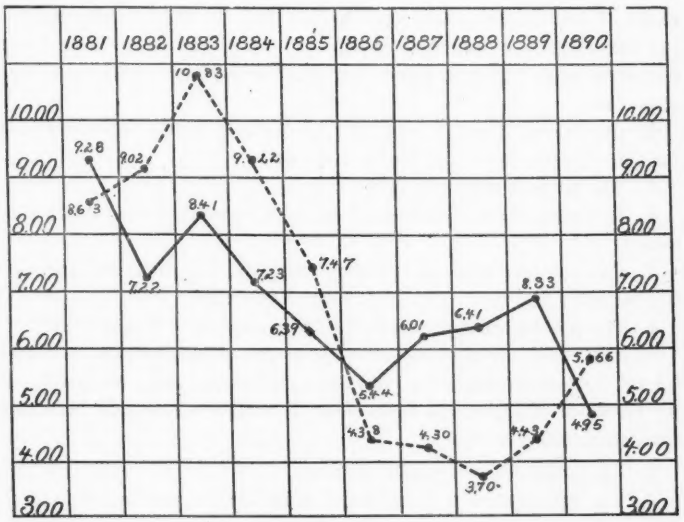


CHART E.

Percentage of Deaths from Croup, Diphtheria and Scarlatina to the Total Mortality in Berlin and Boston for Ten Years—1881-90.

Berlin..... Boston——

A study of Chart E, which shows the percentage of deaths from croup, diphtheria and scarlet fever to the total mortality for ten years, 1881–90, indicates that in Boston, where sulphur is used, the rate has fallen from 9.28 to 4.95, a diminution of 4.33. In Berlin, where the steam process is used, the rate has fallen from 8.63 to 5.66, a diminution of 2.97; 1.36 in favor of Boston. The municipal disinfecting station in Berlin, just described, was opened in 1886; for that year the rate was 4.38, and by following the broken line it will be seen that the percentage varied slightly during the subsequent years, but that in 1890 it reached 5.66, an increase of 1.28. In Boston, on the other hand, it will be seen by following the full line that in 1886 the rate was 5.44, and that in 1890 it was 4.95, a diminution of .49. It is of interest to note that the average percentage for ten years in Berlin is 6.76, and that in Boston it is 6.82. So far as the advantages to be gained from different methods of disinfection are concerned, the foregoing statistics show that the sulphur process, although it may be open to severe criticism, has been an important factor in causing a diminution in the number of cases of scarlet fever and diphtheria; and, on the other hand, that the steam process, although its scientific value cannot be denied, has not been such a potent agent for this purpose as might have been expected.

In conclusion, I would suggest the adoption of the following plan for the suppression of infectious diseases: —

1. The prompt report of cases.
2. The removal to hospital of suitable cases, and the isolation of others.
3. The establishment of private hospitals, in which the patients can be under the care of their family physicians.
4. The posting of cards on houses where cases of disease exist.
5. The careful medical supervision of the public schools, not only for the purpose of detecting mild cases of disease, but also to prevent the return of children who have been ill, until all danger of infection from them has passed.
6. The prohibition of public funerals.
7. The establishment of a disinfecting station and sanitary laundry.
8. The disinfection of the houses in which these diseases have occurred.

9. The establishment of a house of refuge for families during the disinfection of their homes.

In closing, let me add that I have no such Utopian ideas as to suppose, that even with the most elaborate system of disinfection; that with the most careful medical supervision of the schools; and that with the best arranged hospitals it will ever be possible to absolutely stamp out diphtheria and scarlet fever, but it is evident from the history of the course of these diseases in Boston during the past ten years that a very considerable progress has been made towards their suppression.

DISCUSSION.

Dr. Chapin, of Springfield — The most important cause of the spread of contagious disease is the neglect of mild cases by both the family and the physician.

We have had in Springfield an epidemic spreading through the entire city, which originated from a single case of scarlet fever.

Public schools also are an important factor, and I am in favor of a medical supervisor. I would also include tonsilitis as among the contagious diseases, as I do not think a differential diagnosis possible between this and diphtheria. I have had good success with disinfection by sulphur dioxide, using moist fumes. I consider the dust accumulating in the cracks of a school-house floor a source of danger, and I think the floors should be scrubbed with corrosive sublimate quite often.

Dr. Comey, of Clinton — I have had more or less scarlet fever for the past ten years. For the year ending March, 1891, there were two hundred and eighteen cases, forty in the month of October.

As my town has a dense population and many school children, the disease spreads through the schools. It is difficult to enforce school quarantine, as the mild cases do not call a physician, and often returns to school before they have recovered. I am in favor of educating the people in any way possible in regard to these diseases, and the strict enforcement of school quarantine.

I am also in favor of placarding all houses where there are infectious diseases.

Dr. Cutler, of Waltham — There are some diseases which though contagious are so mild that it is hardly worth while to attempt to control them; for example, whooping-cough, measles and chicken-pox.

They are very contagious, but so rarely fatal that a physician is only called exceptionally; hence are hard to manage by a Board of Health, even if it seems worth while.

The diseases which the Board should devote itself to are, in my opinion, diphtheria, typhoid fever, cholera infantum, entero-colitis, small-pox, scarlet fever, tuberculosis, and hydrophobia.

Small-pox can be controlled by vaccination and isolation. Every child should be vaccinated in the first year. Formerly it was the custom for the family physician to attend to this; now it has been thrown upon the Boards of Health. There should be a stricter inspection of all children entering school as regards vaccination.

Scarlet fever and diphtheria should be treated by isolation, disinfection and school quarantine. In typhoid fever the milk and water supply should be inspected by the health officer, and special instruction should be given by him as to the care of the dejections. A case was cited where the germs may have been brought into the house on the person or clothing of a servant.

Hydrophobia. — All dogs should be restrained from running at large in the public streets. Tuberculosis should be considered among the preventable diseases, and stringent measures should be taken to stamp it out. The sputa from phthisical patients should be disinfected and the officers of the Boards of Health should inspect carefully the milk and meat supplies of the town with reference to this disease. Koch and Pasteur's views may be a step in the right direction for all contagious diseases. I favor hospitals for all contagious diseases, and would allow any respectable physician to send patients to such hospitals and retain the care of the case himself. The time will come when all epidemics of contagious disease will be considered an opprobrium to the Board of Health.

Dr. Morrow of Gloucester — I believe that we should take a high stand in relation to contagious diseases, and while it may be that they *will* not be exterminated, yet I believe they *can* be if the right measures are applied. Carelessness is responsible for their spread, and it should be the aim of health officials to awaken a sentiment which will demand absolute quarantine of each case as it arises, for each case may be the cause of a widespread epidemic. Mild cases are the most dangerous as far as the propagation of these diseases is concerned, for they are allowed greater freedom of movement than the severe cases, which are confined to one room and to their beds. Take the history of small-pox for example, and in this disease I would give due credit to vaccination as a protective, yet each case is seized by the authorities and absolutely quarantined while the

germs are destroyed in the room where they were originated. To this isolation and quarantine I believe we should give more credit than we do for our comparative immunity from small-pox, which has not been seen in my city for many years, although we have considerable foreign trade. If the same principles were applied to scarlet-fever, diphtheria and other contagious diseases, it would be reasonable to expect the same results. With others who have spoken this afternoon I believe that the schools are responsible for their spread, or more definitely, the attendance of infected children at the schools; for some cases are so mild that being overlooked the children are not taken from school at all, while other children who are exposed to infection manage to retain their places by various promises or explanations; many also return to school before they are through with the scaling process in scarlet-fever, and I am inclined to believe that many of these cases are not free from this scaling for six weeks, which, there is some reason to believe, would be a better period of exclusion from schools than four weeks; then again, disinfection by thorough washing of the person should be as rigidly done as disinfection of the house or apartments.

We have recently begun the placarding of houses in our city for diphtheria and scarlet fever, and I am much pleased with the way in which the people have received the innovation; and judging from this, I believe the people could be educated to receive other and more rigid methods of quarantine.

Dr. Abbott, of State Board of Health — Hydrophobia runs in waves. In 1890 there were seventeen cases, in 1889 there were fourteen, in 1888 there were only three, while for several years previous to 1888 there were none. Among dogs most cases occur in mongrel curs which run from town to town. I think there is really need of better and more general restriction with regard to the ownership and care of dogs than at present. The disease is wholly preventable.

I would call to your attention especially the prevalence of diphtheria and scarlet fever throughout the state for the last two or three years, and I have with me several charts relative to the same which you can all examine at your leisure later on, and which have been prepared from the reports to the State Board of Health. It seems to me that in addition to the many causes which have been spoken of as means of communicating diseases, there should also be included

that of railroads. Too little attention has been given to this point in the past, and much can be done in the way of railroad disinfection in the future. I have been especially interested in noting the high death-rate from diphtheria in many of the towns along the route of the Boston & Albany Railroad, and wondering how much of it was due to this cause.

I do not think that bad sanitary conditions are in themselves the sole cause of diphtheria, but I do believe that filth, bad drainage, etc., serve as mediums for the development of its germs.

THE OLD OAKEN BUCKET.

AS REVISED BY A SANITARIAN.

With what anguish of mind I remember my childhood,
Recalled in the light of a knowledge since gained;
The malarious farm, the wet, fungus-grown wildwood,
The chills then contracted that since have remained;
The scum-covered duck-pond, the pig-sty close by it,
The ditch where the sour-smelling house-drainage fell,
The damp, shaded dwelling, the foul barn-yard nigh it,
But worse than all else was that terrible well,
And the old oaken bucket, the mould-crusted bucket,
The moss-covered bucket that hung in the well.

Just think of it! Moss on the vessel that lifted
The water I drank in the days called to mind;
Ere I knew what professors and scientists gifted
In the waters of wells by analysis find;
The rotting wood-fibre, the oxide of iron,
The algæ, the frog of unusual size,
The water impure as the verses of Byron,
Are things I remember with tears in my eyes.
And to tell the sad truth — though I shudder to tell it —
I considered that water uncommonly clear,
And often at noon, when I went there to drink it,
I enjoyed it as much as I now enjoy beer.

How ardent I seized it with hands that were grimy!
And quick to the mud-covered bottom it fell!
Then, reeking with nitrates and nitrites, and slimy
With matter organic it rose from the well.
Oh, had I but realized in time to avoid them,
The dangers that lurked in that pestilent draught —
I'd have tested for organic germs, and destroyed them
With potassic permangranate ere I had quaffed:
Or, perchance, I'd have boiled it and afterwards strained it
Through filters of charcoal and gravel combined;
Or, after distilling, condensed and regained it
In potable form, with its filth left behind.

For little I knew of the dread typhoid fever
Which lurked in the water I ventured to drink;
But since I've become a devoted believer
In the teachings of science I shudder to think.
And now, far removed from the scenes I'm describing,
The story for warning to others I tell,
As memory reverts to my youthful imbibing
And I gag at the thought of that horrible well,
And the old oaken bucket, the fungus-grown bucket —
In fact, the slop-bucket — that hung in the well.

— *J. C. Bayles, President New York Board of Health; read at a meeting of the Academy of Medicine.*

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JULY 1, 1891.

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